Appendix A: Glossary

Current Wisconsin Statute Definitions:

340.01(7m) "Commercial driver license (CDL)" means a license issued to a person by this state or another jurisdiction that is in accordance with the requirements of 49 USC 31301 to 31317, or by Canada or Mexico, and that authorizes the licensee to operate certain commercial motor vehicles.

> *49 USC 31301(3) "commercial driver's license" means a license issued by a State to an individual authorizing the individual to operate a class of commercial motor vehicles.*

340.01(8) "Commercial motor vehicle (CMV)" means a motor vehicle designed or used to transport passengers or property and having one or more of the following characteristics:

(a) The vehicle is a single vehicle with a gross vehicle weight rating of 26,001 or more pounds or the vehicle's registered weight or actual gross weight is more than 26,000 pounds.

(b) The vehicle is a combination vehicle with a gross combination weight rating, registered weight or actual gross weight of 26,001 or more pounds inclusive of a towed unit with a gross vehicle weight rating, registered weight or actual gross weight of more than 10,000 pounds.

(c) The vehicle is designed to transport or is actually transporting the driver and 15 or more passengers. If the vehicle is equipped with bench type seats intended to seat more than one person, the passenger carrying capacity shall be determined under s. 340.01 (31) or, if the vehicle is a school bus, by dividing the total seating space measured in inches by 13.

340.01(24)(a) - "Implement of husbandry (IoH)" means a vehicle or piece of equipment or machinery designed for agricultural purposes, used exclusively in the conduct of agricultural operations and used principally off the highway, or a trailer-mounted bulk liquid fertilizer container.

340.01(24)(b) - "Implement of husbandry (IoH)" does not include any motor truck, farm truck, road tractor, truck tractor, or farm truck tractor or such a vehicle combined with a semitrailer, trailer or farm trailer, when the vehicle or combination is a commercial motor vehicle operated on a highway.

341.01(2)(a) - "Implement of husbandry (IoH)" means a vehicle or piece of equipment or machinery designed for agricultural purposes, used exclusively in the conduct of agricultural operations and used principally off the highway, or a trailer-mounted bulk liquid fertilizer container.

Appendix B: Infrastructure Information – Height Considerations

Bridge Postings: Wisconsin Manual On Uniform Traffic Control Devices, page 20, from: http://www.dot.wisconsin.gov/business/engrserv/docs/wmutcd.pdf.

Section 2C.27 Low Clearance Signs (W12-2 and W12-2a)

Standard:

(01) The Low Clearance sign (W12-2) sign shall be used at all points where the clearance over any part of the usually traveled portion of the roadway is less than 14' - 6". Where the clearance is less than 13' – 6" an additional sign to that affect shall be placed at the nearest intersection on which a vehicle can detour onto. The appropriate XXX MILES AHEAD plaque (W57-52) shall be added to the advance sign.

On all freeway/expressway interchanges, low clearance signs shall be placed in advance of the exit over height vehicles can use to avoid the low clearance bridge, as well as at the bridge location itself where the bridge clearance is less than 14' – 6".

Guidance:

On oversize/overweight (OSOW) freight network routes, clearances of 14'-6" or higher should be considered for installation of low clearance signs depending on the OSOW vehicles using specific routes and as approved by the region traffic engineer. Low clearance signs should be considered for clearances of 14'-6" or higher on OSOW secondary routes if the secondary route has structure clearances that are less than on the parallel OSOW primary route.

Option:

At the discretion of the maintaining authority of a roadway, troublesome or frequently hit structures with clearances at 14' - 6" and above may be signed.

If a segment of roadway contains a number of structures that are marked for clearances an advance sign may be placed in advance of an exit that would allow an over height vehicle to detour onto another route. If the lowest structure in the segment is below 14' - 6" the sign shall read "Low Clearance Structures next XX Miles". If the lowest structure is 14' - 6" or above the sign shall read "XX' XX" Minimum Clearance next XX miles". Both of these signs shall have a black legend on a yellow background.

Clearances for Electric Overhead Services: Not for primary or secondary clearances; per NESC Table 232-1 and 234-1 and Wisconsin PSC 114. Note that the following are the minimum clearances needed. Additional clearances must be added to account for the thermal loading, ice loading, and snow depth when looking at vertical clearances. All clearances are for services under 750 volts unless otherwise indicated.

Triplex & Quadruplex Cables (most common)	*Type A*	*Rule 230C3*
Open Wire Poly Insulated Cables	*Type B*	

Vertical Clearances	**Type A**	**Type B**
Roads, Streets, Driveways, Parking Lots, Alleys, Cultivated Land, Grazing, Forest Orchards, etc.		
	16'	16'5"
If the height of the building to which the service is attached does not permit and there is only a residential driveway (no chance of trucks), under 150 volts to ground, and insulated.		
	12'	12'5"
Drip Loop	10'	10'5"
If along roads in rural districts where it is unlikely that vehicles will be crossing under the line (must consider blow out to embankments, etc.).		
	14'	14'5"
If along rural roads and not located relative to fences, ditches, embankments, etc., so that ground under the line would not be expected to be traveled except by pedestrians, may be reduced to the following: The service must be under 150 volts to ground and insulated.		
	9'5"	12'5"
WisDOT minimum clearances over roadway (only State & Federal Highways)(use NESC if greater than this)(under worst case conditions)(WI Maintenance Manual 96.94)		
	17'	17'

Section 232 of the National Electrical Safety Code (NESC): Electric distribution neutral wires have a 15'5" (feet/inches) clearance requirement and primary conductors have an 18'5" (feet/inches) clearance requirement. The aforementioned clearance represents the distance between the road and the bottom of the wire. Neutral wires are, in most cases, bare wires. Thus, having adequate clearance is imperative. *Note: While the above heights are standards, not all overhead wires may adhere to these standards. Checking for clearance will be important prior to operating IoH.*

Reference Link: http://www.wisconsinpublicservice.com/business/manual/7_1.pdf.

Appendix C: Preliminary Drafting Instructions

Overview: Current definitions of Implements of Husbandry (IoH) in Wisconsin statute (Chapters 340, 341, and 348) do not provide for clear distinction among agricultural equipment types. This results in unclear guidance to road users and enforcement regarding size, weight, operating and safety equipment requirements and restrictions and operator qualifications. Current definitions in Wisconsin statutes of farm tractors and IoH are referred to by statutes regarding size, weight, operation requirements, equipment requirements and operator qualifications and requirements. Current terms need to better reflect the desired distinctions between IoH CMVs and non-CMV agricultural equipment.

Current Structure of Wisconsin statutes: Chapter 340 lists definitions of vehicles that apply to Chapters 341-349, with the following exception: where a separate definition is provided in a chapter within the 341-349 range, then it overrides the definition found in Chapter 340. Specifically, the definition of IoH in Chapter 341 regarding vehicle registration ("license plates") overrides the definition found in Chapter 340.

> *For quick reference, here are the chapter topics which relate to the IoH Study Group: Chapter 340 (general provisions and definitions), Chapter 341 (description of vehicle registration – license plates), Chapter 346 (operator requirements), Chapter 347 (vehicle safety and equipment requirements), and Chapter 348 (vehicle size and weight allowances and limitations).*

Reviewed Proposals: In order to provide clarity and guidance to road users and law enforcement regarding size, weight, operating and safety equipment requirements and restrictions and other operator qualifications for IoH, the IoH Study Group has identified the following possible recommendations (*Note: The language below is intended to serve as a guide and is not intended to be perceived as the exact proposed statutory language*):

Definition of "Implement of Husbandry (IoH)":

Recommendation (1): Replace the current statutory definition of IoH, found in s. 340.01(24)(a)&(b), with:

- "Implement of husbandry" means a self-propelled or towed vehicle manufactured, designed, or reconstructed to be used exclusively in the conduct of agricultural operations and used primarily off the highway. An "implement of husbandry" includes a farm tractor, self-propelled application-type vehicles (such as a combine), farm wagon, farm trailer, or trailer adapted to tow or pull another implement of husbandry, or any substantially similar equipment used to transport agricultural products necessary for agricultural production.
- An "implement of husbandry – commercial motor vehicle," or "IoH-CMV" means a reconstructed or principally designed and manufactured vehicle similar to other highway-use vehicles to be used exclusively in the conduct of agricultural operations and used primarily off the highway is considered to be an implement of husbandry. The term "reconstructed" as used in this subsection means materially altered from the original construction by the removal, addition, or substitution of essential parts, new or used for agricultural purposes. A commercial

motor vehicle – implement of husbandry designed for agricultural purposes and used, even temporarily, for non-agricultural purposes shall not be considered an implement of husbandry.

- The existing definition of "implement of husbandry" found in s. 341.01(2)(a) can be removed. Removing the definition of IoH in s. 341.01 will assist in clarifying and simplifying the definition of IoH. However, all IoH will be exempt from registration and a self-certification will be available for CMVs operating as IoH.
- The following terms require no changes: farm tractor (s. 348.01(16)), farm trailer (s. 340.01(17)), farm truck (s. 340.01(18)), and farm truck tractor (s. 340.01(18g)).

Chapter 346.925 "Operator Requirements"

Recommendation (2): Add permit qualifications under 346.925(1) – operator requirements.

- No person may obtain a permit or written authorization, in s. 348.26 and s. 348.27 [*e.g. s. 348.27(14)*], unless a person is 18 years of age and maintains a valid driver's license.

Chapter 348.05 "Width of Vehicles"

Recommendation (3): Institute a width envelope for IoH.

- Implements of husbandry as defined in s. 341.01(24)(a) will have a width envelope is 15' (feet); However, an IoH greater than 15' (feet), but no greater than 17' (feet) may be operated without written authorization when the IoH operator meets safety requirements to ensure safe passage by other road users. A reconstructed commercial motor vehicle designed for agricultural purposes, as defined in 341.01(24)(b) as "IoH-CMV" shall be no wider than 10' (feet), which includes tires and any other agricultural attachments.

Chapter 348.06 "Height of Vehicles"

Recommendation (4): Institute a height envelope for IoH.

- Implements of husbandry as defined in s. 340.01(24)(a) & (b) will have a height envelope of 13'6" (feet/inches); However, an IoH greater than 13'6" (feet/inches) may operate without written authorization. The IoH operator is responsible for ensuring there are no conflicts with over-head obstructions, such as wires or structures.

Chapter 348.07 "Length of Vehicles"

Recommendation (5): Institute a length envelope for IoH.

- Implements of husbandry as defined in s. 340.01(24)(a) & (b) will have a maximum envelope length of 60' (feet) for single IoH.

Chapter 348.08 "Vehicle Trains"

Recommendation (6): Institute a length envelope for IoH vehicle trains.

- A two (2) IoH vehicle combination will have a maximum length envelope of 100' (feet). A three (3) IoH vehicle combination will have a maximum length of 70' (feet). The 70' (feet) length for three (3) IoH vehicle combinations is to prevent the third IoH from "swaying" on the roadway or structure.

Chapter 348.17 "Special or Seasonal Weight Limitations" - Weight

Recommendation (7): Provide a 15% weight allowance over the limits as established by the Federal Bridge Formula, except where posted and during periods of spring thaw for IoH.

- IoH is given an expanded 15% weight allowance over the limits as established by the Federal Bridge Formula, except where posted and during periods of spring thaw. This equates to a maximum single axle weight of 23,000 pounds and a gross vehicle weight of 92,000 pounds. A new IoH weight table will be created to (e.g. 348.30) reflect the 15% allowance based on gross vehicle weight, axle weight and spacing.
- IoH vehicles operating in excess of the 15% allowance will be fined for the amount in excess of standard gross motor vehicle weight or individual axle weight.

Chapter 348.17 "Special or Seasonal Weight Limitations" - Weight

Recommendation (8): Provide a 15% weight allowance over the limits as established by the Federal Bridge Formula, except where posted and during periods of spring thaw for IoH.

- Written authorization to exceed the size envelope and weight limits may be requested on an annual basis from the maintaining authority that has roadway. Written authorizations may only be granted when:
    - The operator is 18 years of age and who holds a valid driver's license.
    - IoH meets lighting, marking, and safety requirements pertaining to IoH in s. 347 (safety requirements).
    - A travel or route plan for the IoH is submitted.

  Additional conditions may be set by each maintaining authority (local or state) of which the IoH is operating within the context of the written authorization.

IoH Weight Table

Recommendation (9): Create a new weight table to be placed in Chapter 348 for IoH.

- Create a new weight table to be placed in Chapter 348 for IoH (*e.g. 348.30*).
- Reasoning: The engineering analysis for IoH Study is based on the Federal Bridge Formula, thus, for clarity purposes (public and enforcement) a weight table be established for reasonable ease to determine if IoH is legal and is eligible for written authorization.

Conclusions/summary: Establishing clear definitions of implements of husbandry will assist in determining whether a vehicle, piece of equipment or machinery, or trailer is designed for agricultural purposes and used exclusively in the conduct of agricultural operations. Additionally, clear and concise definitions of implements of husbandry will assist in distinguishing the differences between farm tractors, self-propelled IoH, IoH trains, IoH-CMVs and other non-CMV agricultural equipment for law enforcement and the motoring public.

Appendix D: IoH Weight Table

PROVISIONS:

a. Single axle: 23,000

b. Patterned after Figure 348.29 and Figure 348.295, Wis. Stats.

Maximum gross weight in pounds on a group of --

Distances in feet between foremost and rearmost axles of a group	2 axles of a vehicle or combination of vehicles	3 axles of a vehicle or combination of vehicles	4 axles of a vehicle or combination of vehicles	5 axles of a vehicle or combination of vehicles	6 axles of a vehicle or combination of vehicles	7 axles of a vehicle or combination of vehicles	8 axles of a vehicle or combination of vehicles
4	39,500	45,000	51,500	58,500	65,000	72,000	79,000
5	40,500	46,000	52,500	59,000	66,000	72,500	79,500
6	41,500	47,000	53,000	60,000	66,500	73,500	80,000
7	43,000	47,500	54,000	60,500	67,000	74,000	80,500
8	44,000	48,500	54,500	61,000	68,000	74,500	81,500
9	45,000	49,500	55,500	62,000	68,500	75,500	82,000
10	46,000	50,500	56,000	62,500	69,000	76,000	82,500
11		51,000	57,000	63,500	70,000	76,500	83,500
12		52,000	57,500	64,000	70,500	77,500	84,000
13		53,000	58,500	65,000	71,500	78,000	84,500
14		53,500	59,500	65,500	72,000	78,500	85,500
15		54,500	60,000	66,000	72,500	79,500	86,000
16		55,500	61,000	67,000	73,500	80,000	86,500
17		56,500	61,500	67,500	74,000	80,500	87,500
18		57,000	62,500	68,500	75,000	81,500	88,000
19		58,000	63,000	69,000	75,500	82,000	88,500
20		59,000	64,000	70,000	76,000	82,500	89,500
21		60,000	64,500	70,500	77,000	83,500	90,000
22		60,500	65,500	71,500	77,500	84,000	90,500
23		61,500	66,000	72,000	78,000	84,500	91,500
24		62,500	67,000	72,500	79,000	85,500	92,000
25		63,000	67,500	73,500	79,500	86,000	
26		64,000	68,500	74,000	80,500	86,500	
27		65,000	69,000	75,000	81,000	87,500	
28		66,000	70,000	75,500	81,500	88,000	
29			71,000	76,500	82,500	88,500	
30			71,500	77,000	83,000	89,500	
31			72,500	77,500	83,500	90,000	
32			73,000	78,500	84,500	90,500	
33			74,000	79,000	85,000	91,500	

Distances in feet between foremost and rearmost axles of a group	2 axles of a vehicle or combination of vehicles	3 axles of a vehicle or combination of vehicles	4 axles of a vehicle or combination of vehicles	5 axles of a vehicle or combination of vehicles	6 axles of a vehicle or combination of vehicles	7 axles of a vehicle or combination of vehicles	8 axles of a vehicle or combination of vehicles
35			75,500	80,500	86,500		
36			76,000	81,500	87,000		
37			77,000	82,000	88,000		
38			77,500	83,000	88,500		
39			78,500	83,500	89,500		
40			79,000	84,000	90,000		
41			80,000	85,000	90,500		
42			80,500	85,500	91,500		
43			81,500	86,500	92,000		
44			82,500	87,000			
45			83,000	88,000			
46			84,000	88,500			
47			84,500	89,000			
48			85,500	90,000			
49			86,000	90,500			
50			87,000	91,500			
51			87,500	92,000			
52			88,500				
53			89,000				
54			90,000				
55			90,500				
56			91,500				
57			92,000				

Appendix E: Example Written Authorization Form

DRAFT: Written Authorization For The Transportation of Implements of Husbandry Of Excessive Size & Weight

Written Authorization number_____. Issued at_____
(location of local authorizing jurisdiction), Wisconsin on _____(Date –MM/DD/YYYY).

Issued to (name of operator)_____ by
the Town of _____ in _____ County,
Wisconsin.

Nature of Load: _____.

Make and Model of IoH: _____

_____.

Gross Weight of IoH: _____.

Size of IoH (width, height, length): _____

_____.

Route over roadways: _____

_____.

Special Conditions (check all that apply and write-in conditions as appropriate):

- ☐ Maintenance and Repair of Described Route
- ☐ Speed limit of _____ (unless posted roadway speed limit is lower).
- ☐ No travel on weekends and holidays.
- ☐ No travel during hours of darkness.
- ☐ Travel only on days of the week listed: _____.
- ☐ Travel between _____ AM/PM (circle) and _____ AM/PM (circle).
- ☐ Other: _____
  _____.

Good in the issuing Township from _____ (date – MM/DD/YYYY) to
_____ (date – MM/DD/YYYY) for:

One Trip or Multiple Trips

(Circle One)

Issued on condition that written authorization holder assumes complete responsibility for all damage resulting from this trip.

Issued By: _____.

Title: _____.

Accepted subject to conditions imposed:

_____

Signature of Written Authorization Holder

Insurance Company Name: _____.

Policy Number: _____.

Expiration Date: _____ (Date – MM/DD/YYYY).

Written Authorization Must Be Carried By Operator.

Appendix F: Engineering Analysis (Equipment Matrix)

Category I: IoH - Primes

IoH Category	Photo	Vehicle ID	Vehicle Make	EMPTY CONFIGURATION					FULLY-LOADED CONFIGURATION				
				Gross Weight	Meets FBF?	Controlling Element for FBF	BRIDGE Impact	PAVEMENT Impact	Gross Weight	Meets FBF?	Controlling Element for FBF	BRIDGE Impact	PAVEMENT Impact
I		T1	John Deere 8430	Total = 30,240 lbs Axle 1 = 12,900 Axle 2 = 17,300 lbs	YES	Axle 2 = 17,300 lbs 87% of FBF	LOW	LOW	Total = 30,240 lbs Axle 1 = 12,900 Axle 2 = 17,300 lbs	YES	Axle 2 = 17,300 lbs 87% of FBF	LOW	LOW
I		T2	M. Ferguson 8470	Total = 21,780 lbs Axle 1 = 9,080 lbs Axle 2 = 12,700 lbs	YES	Axle 2 = 12,700 lbs 64% of FBF	LOW	LOW	Total = 21,780 lbs Axle 1 = 9,080 lbs Axle 2 = 12,700 lbs	YES	Axle 2 = 12,700 lbs 64% of FBF	LOW	LOW
I		T6	John Deere 8230	Total = 30,820 lbs Axle 1 = 13,220 lbs Axle 2 = 17,600 lbs	YES	Axle 2 = 17,600 lbs 88% of FBF	LOW	LOW	Total = 30,820 lbs Axle 1 = 13,220 lbs Axle 2 = 17,600 lbs	YES	Axle 2 = 17,600 lbs 88% of FBF	LOW	LOW
I		T7	Case IH 275	Total = 32,900 lbs Axle 1 = 13,880 lbs Axle 2 = 19,020 lbs	YES	Axle 2 = 19,020 lbs 95% of FBF	LOW	LOW	Total = 32,900 lbs Axle 1 = 13,880 lbs Axle 2 = 19,020 lbs	YES	Axle 2 = 19,020 lbs 95% of FBF	LOW	LOW
I		G1	Case IH 9330	Total = 27,400 lbs Axle 1 = 12,600 lbs Axle 2 = 14,800 lbs	YES	Axle 2 = 14,800 lbs 74% of FBF	LOW	LOW	Total = 27,400 lbs Axle 1 = 12,600 lbs Axle 2 = 14,800 lbs	YES	Axle 2 = 14,800 lbs 74% of FBF	LOW	LOW
I		T8	Case IH Stieger 485	Total = 53,430 lbs Axle 1 = 26,480 lbs Axle 2 = 26,950 lbs	NO	Axle 2 = 26,950 lbs 135% of FBF	MEDIUM	HIGH	Total = 53,430 lbs Axle 1 = 26,480 lbs Axle 2 = 26,950 lbs	NO	Axle 2 = 26,950 lbs 132% of FBF	MEDIUM	HIGH

Category II: Self-Propelled IoH

IoH Category	Photo	Vehicle ID	Vehicle Make	EMPTY CONFIGURATION					FULLY-LOADED CONFIGURATION				
				Gross Weight	Meets FBF?	Controlling Element for FBF	BRIDGE Impact	PAVEMENT Impact	Gross Weight	Meets FBF?	Controlling Element for FBF	BRIDGE Impact	PAVEMENT Impact
II		N/A	John Deere Forage Harvester 7980	Total = 36,538 lbs Axle 1 = 21,923 lbs Axle 2 = 14,615 lbs	NO	Axle 1 = 21,923 lbs 110% of FBF	LOW	MEDIUM	Total = 45,718 lbs Axle 1 = 27,431 lbs Axle 2 = 18,287 lbs	NO	Axle 2 = 27,431 lbs 137% of FBF	MEDIUM	MEDIUM
II		S3	AGCO Terragator 8204	Total = 31,600 lbs Axle 1 = 13,920 lbs Axle 2 = 17,680 lbs	YES	Axle 2 = 17,860 lbs 89% of FBF	LOW	LOW	Total = 49,000 lbs Axle 1 = 20,000 lbs Axle 2 = 29,000 lbs	NO	Axle 2 = 29,000 lbs 145% of FBF	MEDIUM	HIGH
II		R4	AGCO Terragator 9203	Total = 37,540 lbs Axle 1 = 13,700 lbs Axle 2 = 23,840 lbs	NO	Axle 2 = 23,840 lbs 119% of FBF	LOW	HIGH	Total = 58,000 lbs Axle 1 = 16,800 lbs Axle 2 = 41,200 lbs	NO	Axle 2 = 41,200 lbs 206% of FBF	MEDIUM	HIGH
II		R5	AGCO Terragator 8144	Total = 31,730 lbs Axle 1 = 15,290 lbs Axle 2 = 16,440 lbs	YES	Axle 2 = 16,440 lbs 82% of FBF	LOW	LOW	Total = 47,100 lbs Axle 1 = 16,400 lbs Axle 2 = 30,700 lbs	NO	Axle 2 = 30,700 lbs 153% of FBF	MEDIUM	HIGH
II		R6	AGCO Terragator 3104	Total = 42,050 lbs Axle 1 = 24,150 lbs Axle 2 = 17,900 lbs	NO	Axle 1 = 24,150 lbs 121% of FBF	LOW	HIGH	Total = 74,700 lbs Axle 1 = 26,000 lbs Axle 2 = 48,700 lbs	NO	Axle 2 = 48,700 lbs 244% of FBF	HIGH	VERY HIGH

Category III: IoH CMV Conversions

IoH Category	Photo	Vehicle ID	Vehicle Make	EMPTY CONFIGURATION					FULLY-LOADED CONFIGURATION				
				Gross Weight	Meets FBF?	Controlling Element for FBF	BRIDGE Impact	PAVEMENT Impact	Gross Weight	Meets FBF?	Controlling Element for FBF	BRIDGE Impact	PAVEMENT Impact
III		S4	Homemade	Total = 27,860 lbs Axle 1 = 12,680 lbs Axle 2 = 6,480 lbs Axle 3 = 8,700 lbs	YES	Total = 27,860 lbs 70% of FBF	LOW	LOW	Total = 65,000 lbs Axle 1 = 16,000 lbs Axle 2 = 24,500 lbs Axle 3 = 24,500 lbs	NO	Tandem = 49,000 lbs 144% of FBF	MEDIUM	MEDIUM
III		S5	Homemade	Total = 28,100 lbs Axle 1 = 12,700 lbs Axle 2 = 8,320 lbs Axle 3 = 7,080 lbs	YES	Total = 28,100 lbs 70% of FBF	LOW	LOW	Total = 62,300 lbs Axle 1 = 19,300 lbs Axle 2 = 21,500 lbs Axle 3 = 21,500 lbs	NO	Tandem = 43,000 lbs 126% of FBF	MEDIUM	LOW

Category IV: IoH Vehicle Trains

IoH Category	Photo	Vehicle ID	Vehicle Make	EMPTY CONFIGURATION					FULLY-LOADED CONFIGURATION				
				Gross Weight	Meets FBF?	Controlling Element for FBF	BRIDGE Impact	PAVEMENT Impact	Gross Weight	Meets FBF?	Controlling Element for FBF	BRIDGE Impact	PAVEMENT Impact
IV		T1	John Deere 8430 w/Houle Tank	Total = 44,500 lbs Axle 1 = 12,940 lbs Axle 2 = 17,300 lbs Axle 3 = 6,280 lbs Axle 4 = 7,980 lbs	YES	Axle 2 = 17,300 lbs 87% of FBF	LOW	LOW	Total = 81,000 lbs Axle 1 = 11,000 lbs Axle 2 = 25,000 lbs Axle 3 = 21,000 lbs Axle 4 = 24,000 lbs	NO	Axle 2 = 25,000 lbs 125% of FBF	HIGH	MEDIUM
IV		T2	M. Ferguson 8470 w/Husky Tank	Total = 30,780 lbs Axle 1 = 9,080 lbs Axle 2 = 12,700 lbs Axle 3 = 4,520 lbs Axle 4 = 4,480 lbs	YES	Axle 2 = 12,700 lbs 64% of FBF	LOW	LOW	Total = 63,900 lbs Axle 1 = 9,500 lbs Axle 2 = 17,800 lbs Axle 3 = 18,800 lbs Axle 4 = 17,800 lbs	NO	Tandem = 36,600 lbs 108% of FBF	MEDIUM	LOW
IV		T6	John Deere 8230 w/Husky Tank	Total = 45,860 lbs Axle 1 = 13,220 lbs Axle 2 = 17,600 lbs Axle 3 = 7,140 lbs Axle 4 = 7,900 lbs	YES	Axle 2 = 17,600 lbs 88% of FBF	LOW	LOW	Total = 89,700 lbs Axle 1 = 11,200 lbs Axle 2 = 23,500 lbs Axle 3 = 23,500 lbs Axle 4 = 31,500 lbs	NO	Tandem = 55,000 lbs 162% of FBF	HIGH	HIGH
IV		T7	Case IH 275 w/Houle Tank	Total = 58,540 lbs Axle 1 = 13,880 lbs Axle 2 = 19,020 lbs Axle 3 = 8,520 lbs Axle 4 = 8,440 lbs Axle 5 = 8,680 lbs	YES	Axle 2 = 19,020 lbs 95% of FBF	LOW	MEDIUM	Total = 105,300 lbs Axle 1 = 10,300 lbs Axle 2 = 24,000 lbs Axle 3 = 23,000 lbs Axle 4 = 24,000 lbs Axle 5 = 24,000 lbs	NO	Tridem = 71,000 lbs 169% of FBF	HIGH	HIGH
IV		T8	Case IH 485 w/Houle Tank	Total = 78,290 lbs Axle 1 = 26,480 lbs Axle 2 = 26,950 lbs Axle 3 = 6,120 lbs Axle 4 = 6,140 lbs Axle 5 = 6,080 lbs Axle 6 = 6,520 lbs	NO	Axle 2 = 26,950 lbs 132% of FBF	MEDIUM	HIGH	Total = 134,000 lbs Axle 1 = 11,100 lbs Axle 2 = 26,000 lbs Axle 3 = 22,500 lbs Axle 4 = 24,800 lbs Axle 5 = 24,800 lbs Axle 6 = 24,800 lbs	NO	Quad = 96,900 lbs 181% of FBF	HIGH	HIGH
IV		G1	Case IH 9330 w/Parker 938 Cart	Total = 37,900 lbs Axle 1 = 12,600 lbs Axle 2 = 14,800 lbs Axle 3 = 10,500 lbs	YES	Axle 2 = 14,800 lbs 74% of FBF	LOW	LOW	Total = 87,400 lbs Axle 1 = 8,700 lbs Axle 2 = 29,700 lbs Axle 3 = 49,000 lbs	NO	Axle 3 = 49,000 lbs 245% of FBF	HIGH	HIGH

Appendix G: Equipment Specifications

Vehicle axle weights are tabulated in this section for all tested load levels and test seasons. All weights were measured and presented in pounds as shown in Table G.1 through Table G.6. Consequently, the axle configurations and dimensions of tested vehicles are presented as shown in Figure G.1 through Figure G.3. All dimensions were measured and presented in inches. * MnROAD Study

Table G.1. Vehicle Axle Weights for Spring 2008 Test (MnROAD Study)

Vehicle	S4, Homemade, 4,400 gal				S5, Homemade, 4,400 gal				T1, John Deere 8430, 6,000 gal			
Load Level	0%	25%	50%	80%	0%	25%	50%	80%	0%	25%	50%	80%
Axle 1	10,440	11,600	12,560	13,540	12,700	14,180	15,700	17,520	12,940	12,360	11,440	11,080
Axle 2	7,700	11,000	15,060	19,320	8,320	12,120	15,740	19,760	17,300	19,220	23,000	24,560
Axle 3	6,820	11,200	15,540	20,240	7,080	10,860	15,150	19,900	6,280	11,540	16,760	21,000
Axle 4									7,980	13,440	19,550	24,680
Axle 5												
Axle 6												
Total	24,960	33,800	43,160	53,100	28,100	37,160	46,590	57,180	44,500	56,560	70,750	81,320
Vehicle	S3, Terragator 8204				T2, M.Ferguson 8470, 4,000 gal				T6, John Deere 8430, 6,000 gal			
Load Level	0%	25%	50%	80%	0%	25%	50%	80%	0%	25%	50%	80%
Axle 1	13,920	14,000	14,120	14,980	9,080	9,060	8,580	8,400	13,220	12,660	11,940	11,600
Axle 2	17,680	20,880	24,820	30,600	12,700	13,460	15,220	16,180	17,600	17,700	20,860	22,420
Axle 3					4,520	8,260	12,100	16,920	7,140	12,420	16,620	22,440
Axle 4					4,480	7,660	11,440	15,620	7,900	13,760	19,760	26,640
Axle 5												
Axle 6												
Total	31,600	34,880	38,940	45,580	30,780	38,440	47,340	57,120	45,860	56,540	69,180	83,100

Table G.2. Vehicle Axle Weights for Fall 2008 Test (MnROAD Study)

Vehicle	R4, Terragator 9203				T6, John Deere 8430, 6,000 gal				T7, Case IH 245, 7,300 gal			
Load Level	0%	25%	50%	80%	0%	25%	50%	80%	0%	25%	50%	80%
Axle 1	13,700	13,760	14,440	14,940	13,390	12,600	11,900	11,660	11,620	11,040	11,100	9,580
Axle 2	23,840	28,640	32,820	38,420	16,980	19,200	20,660	22,640	16,820	18,880	19,500	22,680
Axle 3					7,560	12,740	17,920	24,880	6,380	10,680	14,420	19,380
Axle 4					7,480	14,360	20,820	26,900	6,600	10,980	15,940	21,040
Axle 5									6,520	10,540	15,900	21,120
Axle 6												
Total	37,540	42,400	47,260	53,360	45,410	58,900	71,300	86,080	47,940	62,120	76,860	93,800
Vehicle	T8, Case IH 485, 9,500 gal				Mn80							
Load Level	0%	25%	50%	80%	80-kip							
Axle 1	26,480	25,620		25,200	12,000							
Axle 2	26,950	30,220		34,540	17,000							
Axle 3	6,120	9,670		18,240	17,000							
Axle 4	6,140	10,660		20,360	16,000							
Axle 5	6,080	10,380		20,220	18,000							
Axle 6	6,520	10,400		20,220								
Total	78,290	96,950		138,780	80,000							

Table G.3. Vehicle Axle Weights for Spring 2009 Test (MnROAD Study)

Vehicle	S4, Homemade, 4,400 gal				S5, Homemade, 4,400 gal				R4, Terragator 9203			
Load Level	0%	25%	50%	80%	0%	25%	50%	80%	0%	25%	50%	80%
Axle 1	12,680	13,940	15,100	16,600	11,140	12,080	13,280	15,400	12,800	13,020	13,620	13,900
Axle 2	6,480	9,900	15,600	19,520	6,940	11,120	14,320	19,400	23,720	28,160	34,440	39,340
Axle 3	8,700	12,420	16,280	21,460	7,100	10,840	15,340	20,040				
Axle 4												
Axle 5												
Axle 6												
Total	27,860	36,260	46,980	57,580	25,180	34,040	42,940	54,840	36,520	41,180	48,060	53,240
Vehicle	R5, Terragator 8144				T6, John Deere 8230, 6,000 gal				T7, Case IH 335, 7,300 gal			
Load Level	0%	25%	50%	80%	0%	25%	50%	80%	0%	25%	50%	80%
Axle 1	15,240	15,580	16,260	16,780	7,900	7,500	7,240	6,320	13,880	13,760	11,820	17,240
Axle 2	16,240	19,940	23,340	26,960	15,860	17,720	19,140	20,960	19,020	20,440	23,080	18,360
Axle 3					7,140	12,160	17,460	20,480	8,520	12,680	17,680	22,840
Axle 4					7,880	13,240	19,400	22,460	8,440	12,780	17,540	22,720
Axle 5									8,680	13,180	17,930	22,440
Axle 6												
Total	31,480	35,520	39,600	43,740	38,780	50,620	63,240	70,220	58,540	72,840	88,050	103,600

Vehicle	T8, Case IH 335, 9,500 gal				Mn80	Mn102
Load Level	0%	25%	50%	80%	80-kip	102-kip
Axle 1	17,400	17,800	17,240	15,540	11,640	12,880
Axle 2	18,060	21,480	22,260	26,040	17,080	22,180
Axle 3	5,660	9,700	14,540	18,760	16,760	21,540
Axle 4	6,100	10,500	16,200	21,280	18,460	22,680
Axle 5	5,720	10,240	16,060	20,840	15,620	22,960
Axle 6	5,960	10,620	15,780	21,380		
Total	58,900	80,340	102,080	123,840	79,560	10,2240

Table G.4. Vehicle Axle Weights for Fall 2009 Test (MnROAD Study)

Vehicle	R5, Terragator 8144			T6, John Deere 8230, 6,000 gal			T7, Case IH 275, 7,300 gal		
Load Level	0%	50%	100%	0%	50%	100%	0%	50%	100%
Axle 1	15,290	16,450	17,150	9,110	8,900	8,100	8,800	8,100	6,900
Axle 2	16,440	23,500	29,950	15,710	18,600	21,400	13,500	16,400	19,800
Axle 3				6,990	16,600	26,500	7,700	17,100	26,300
Axle 4				7,900	20,300	33,500	7,500	16,900	26,200
Axle 5							7,600	17,100	26,000
Axle 6									
Total	31,730	39,950	47,100	39,710	64,400	89,500	45,100	75,600	105,200

Vehicle	T8, Case IH 335, 9,500 gal			Mn80	Mn102
Load Level	0%	50%	100%	80-kip	102-kip
Axle 1	16,800	16,100	14,800	12,100	12,780
Axle 2	18,000	21,000	25,200	17,440	24,440
Axle 3	5,900	14,900	23,300	16,050	20,780
Axle 4	5,900	15,100	23,700	18,830	24,330
Axle 5	5,700	15,100	23,500	16,670	22,910
Axle 6	5,900	15,400	23,700		
Total	58,200	97,600	134,200	81,090	105,240

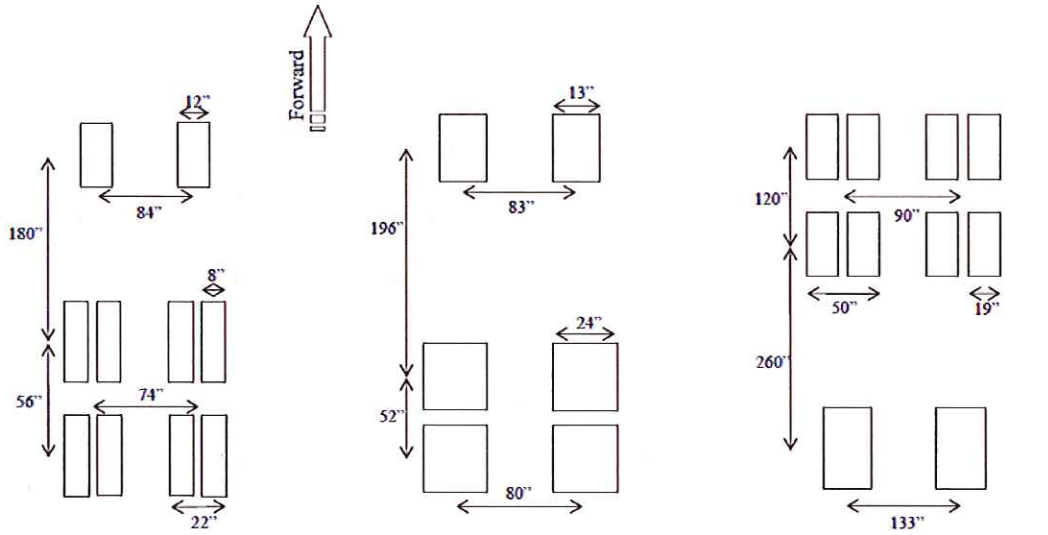
Table G.5. Vehicle Axle Weights for Spring 2010 Test (MnROAD Study)

Vehicle	R6, Terragator 3104			T6, John Deere 8230, 6,000 gal			Mn80	Mn102
Load Level	0%	50%	100%	0%	50%	100%	80-kip	102-kip
Axle 1	24,150	28,300	32,800	8,200	7,500	6,200	12,550	12,200
Axle 2	17,900	28,700	41,900	17,600	21,000	23,500	16,000	22,950
Axle 3				7,200	16,900	26,000	17,800	22,250
Axle 4				8,000	21,400	33,900	16,000	20,700
Axle 5							17,800	25,000
Axle 6								
Total	42,050	57,000	74,700	41,000	66,800	89,600	80,150	103,100

Table G.6. Vehicle Axle Weights for Fall 2010 Test (MnROAD Study)

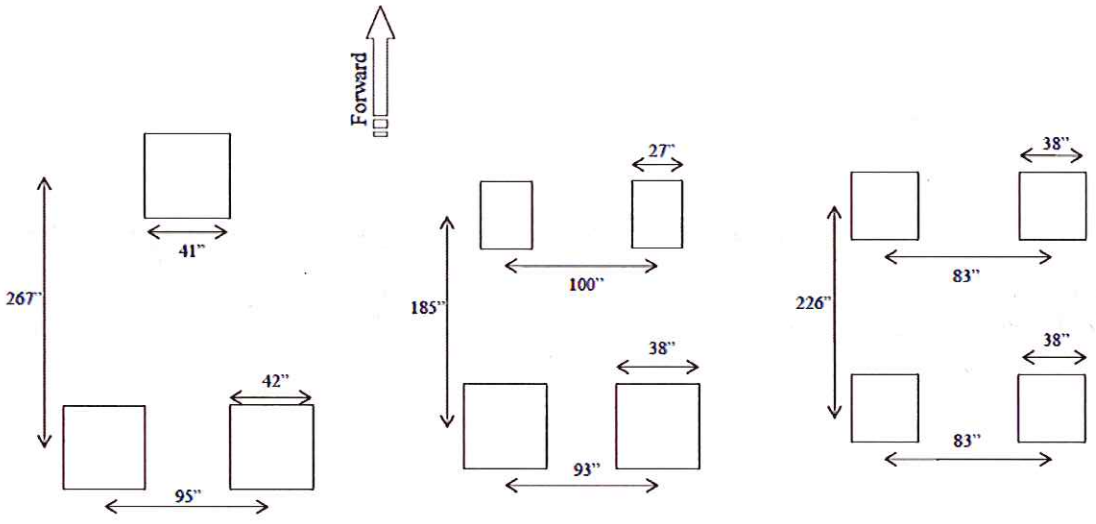
Vehicle	G1, Case IH 9330, 1,000 bushels		T6, New Holland TG245, 6,000 gal		Mn80	Mn102
Load Level	0%	100%	0%	100%	80-kip	102-kip
Axle 1	12,600	11,500	11,400	11,200	11,450	12,400
Axle 2	14,800	18,700	17,500	23,000	17,200	22,950
Axle 3	10,500	57,200	7,000	24,700	17,200	22,250
Axle 4			7,900	31,400	14,300	19,900
Axle 5					19,300	25,600
Axle 6						
Total	37,900	87,400	43,800	90,300	79,450	103,100

Figure G.1. Dimensions for Vehicles S4, S5, and G1 (MnROAD Study)



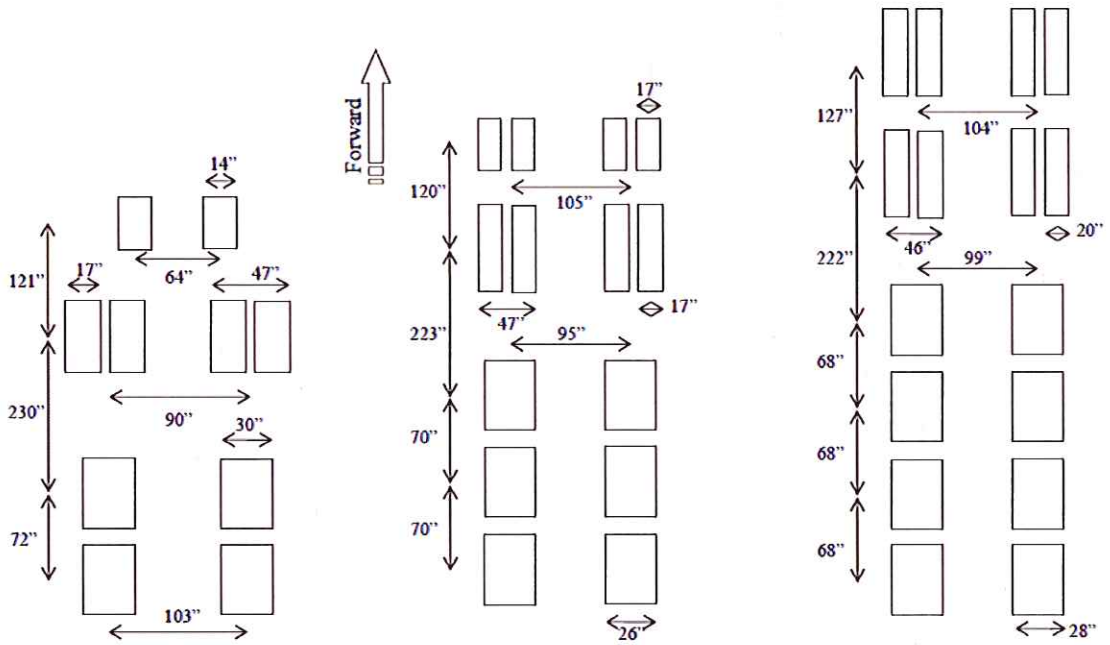
S4 (Homemade 4,400 gal – radial tires) S5 (Homemade 4,400 gal – flotation tires) G1 (Case IH 9330, 1,000 bushels)

Figure G.2. Dimensions for Vehicles R4, R5, and R6 (MnROAD Study)



R4 (AGCO Terragator 9203) R5 (AGCO Terragator 8144) R6 (ACGO Terragator 3104)

Figure G.3. Dimensions for Vehicles T6, T7, and T8 (MnROAD Study)



T6 (John Deere 8203, 6,000 gal) T7 (Case IH 335, 7,300 gal) T8 (Case IH 335, 9,500 gal)

Figure G.4. Self-Propelled Forage Harvester Specifications (Estimates based-off published manufacturer data).

John Deere Model	Length(in)	Width(in)	Height(in)	Total Weight(lbs)	Drive Axle Weight(lbs)	Rear Axle Weight(lbs)
7980 without heads	267	136	147	36,538	21,923	14,615
7980 with 12 row corn head	361	136	147	45,718	27,431	18,287
7980 with largest hay head	314	190	147	40,645	23,907	15,938
Maximum Dimensions	**361**	**190**	**147**	**45,718**	**27,431**	**18,287**

Implements of Husbandry Study

Phase II Report to the Secretary of the Wisconsin Department of Transportation

Website: http://www.dot.wisconsin.gov/business/index.htm

Contact: *IoHStudyFeedback@dot.wi.gov*

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